

An "Intergeneric" Hybrid: *Aglaomorpha* × *Drynaria*

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In 1969 I was asked to identify a garden plant obviously related to *Aglaomorpha*, but not matching any known species. I was uncertain whether the plant was a variation of *Aglaomorpha coronans* (Wall. ex Mett.) Copel. or a hybrid involving that species. In 1972, herbarium specimens were sent to C. V. Morton of the United States National Herbarium and to F. M. Jarrett of the Royal Botanic Gardens, Kew. Mr. Morton wrote that the plant was near *A. coronans* but hardly that species. Dr. Jarrett wondered if it might possibly be a hybrid between *Aglaomorpha* and *Drynaria*. Others thought it might be a variant of *A. coronans*. From the study of *Drynarioideae* by Roos (1985), I was able to ascertain that the plant was not a variant of *A. coronans*, nor the hybrid (*A. ×leporella*), nor any other taxa treated in his monograph.

The original source of this unidentified plant was Mr. Al Roberts, a nurseryman who specialized in ferns and was the proprietor of the former Robert's Subtropical Gardens, Los Angeles, California. Before the appearance of this unidentified plant, Mr. Roberts had related to me that he routinely planted different spores together for convenience and had done so with species received from the Berkeley Botanical Gardens, University of California, Berkeley, California. This led me to suspect the unknown plant was a hybrid. Unmistakably present in this putative hybrid are characteristics of *A. coronans*, a plant that was well known in cultivation long before 1954 and was often grown by fern collectors. Herbarium records indicate that *Drynaria rigidula* (Sw.) Bedd. was growing at the Berkeley Botanical Garden in 1953 and had been distributed to tradesmen; herbarium records indicate Mr. Roberts had this species by 1958. He apparently sowed *A. coronans* together with *D. rigidula* and produced this hybrid sometime between 1953 and before 1959, the year his nursery closed.

During this period my records indicate that other *aglaomorphas* and *drynarias* were in local cultivation, and I therefore examined them as possible parents. These species were found to be unlikely parents as the putative hybrid has no hint of the strongly contracted fertile lobes and relatively large, consistently round sori of *A. meyeniana* Schott, nor the immense fronds and many small scattered sori of *A. heraclea* (Kunze) Copel., nor the round sori in two rows of *D. quercifolia* (L.) J. Sm. If *A. coronans* is one parent, the hybrid's pinnatisect blades and notched pinnae rule out these unlikely parents further, as they all have pinnatifid blades and entire pinnae. This left *D. rigidula* with its pinnate fronds and serrate margins as the most plausible second parent. Also, all of the unlikely parents are tender plants, while the proposed parents and their putative hybrid are hardier.

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Mr. Bob Golden of Los Angeles, who first brought this hybrid to my attention, said he obtained it from Mr. Roberts. From here it was passed from one collector to another; being sterile, it was propagated by division and sold in very limited quantities. Fern fanciers called it *A. 'Roberts'* or *A. species*. In recent years Serge Zimberoff of Santa Rosa Nursery, Santa Rosa, California, propagated the plant through tissue culture and widely distributed it under the name *A. 'Santa Rosa'* though acknowledging that it was also known as *A. 'Roberts'* (Zimberoff, 1986).

From the above circumstantial evidence and a study of the morphological features, the parents of this putative hybrid are considered to be *A. coronans* and *D. rigidula*, an intergeneric hybrid under currently accepted generic boundaries. The hybrid may be known as:

× ***Aglaonaria robertsii*** Hoshizaki, nothogen. & nothosp. nov.—TYPE: Orange, California, from a plant grown by Leo Porter, Porter's Tropicals, August 1973, Hoshizaki 73-131 (LA). Fig. 1 f-h, Fig. 2a, c.

Planta hybrida hortensis inter *Aglaomorpham coronantem* (Wall. ex. Mett.) Copel. et *Drynariam rigidulam* (Sw.) Bedd., frondibus admodum monomorphis, sessilibus vel substipitatis, basibus humus-retinentibus, anguste vel late dilatatis, sinuosis vel vadose vel profunde lobatis, partibus foliaceis pinnatisectis, lobis supra bases leviter constrictis, ad costas adnatis, marginibus inter venas principales inconspicue incisus, apicibus pinnatilobis usque ad segmenta unica terminalia parva elongata vel abortiva, hydathodis nullis sed apicibus venarum plerumque tumidis, soris orbiculatis, oblongis vel elongatis, plerumque unicis, interdum duobis discretis vel connatis, inter venas principales portatis, sporangiis pro parte maxima abortivis, sporis irregularibus.

The most conspicuous structure distinguishing this hybrid from its parents is the intermediate appearance of the frond (Fig. 1). The foliaceous part is mainly pinnatisect in the hybrid, pinnatifid in *A. coronans*, and pinnate in *D. rigidula*. Most pinnae are slightly constricted above their adnate base in the hybrid (Fig. 2a), while the width of the lobes is relatively even in *A. coronans* and the pinna bases are tapered in *D. rigidula*. The hybrid's adjacent pinnae are inconspicuously connected by extensions of their thin cartilaginous margin, if they are connected at all. In *A. coronans* adjacent lobes are connected by a wing along the rachis, whereas in *D. rigidula* pinnae are separate. The lighter green color, firm texture, and slightly raised veins also separate the hybrid from *A. coronans*, which has a dark green color, a hard leathery texture, and prominently raised veins. The frond apex in the hybrid is pinnately lobed to nearly the tip, where it ends in a small elongate terminal segment that may sometimes be aborted (Fig. 1f, h). In *A. coronans* the terminal segment is typically long and entire except for 2-3 coarse lobes at its base (Fig. 1a); in *D. rigidula* the terminal pinna is usually absent (Fig. 1b, d), or if present is conform. The pinna margins of the hybrid are obscurely serrate in most places (not deeper than the width of the cartilaginous margin), while they are entire in *A. coronans* and shallowly serrate (deeper than the cartilaginous margin) in *D. rigidula* (Fig. 2b-d). Hydathodes are absent in the hybrid but the vein tips are often enlarged. Hydathodes are present in *A. coronans* but absent in *D. rigidula*. The sori are intermediate in shape between the parents (Fig. 2), or sometimes more like *A.*

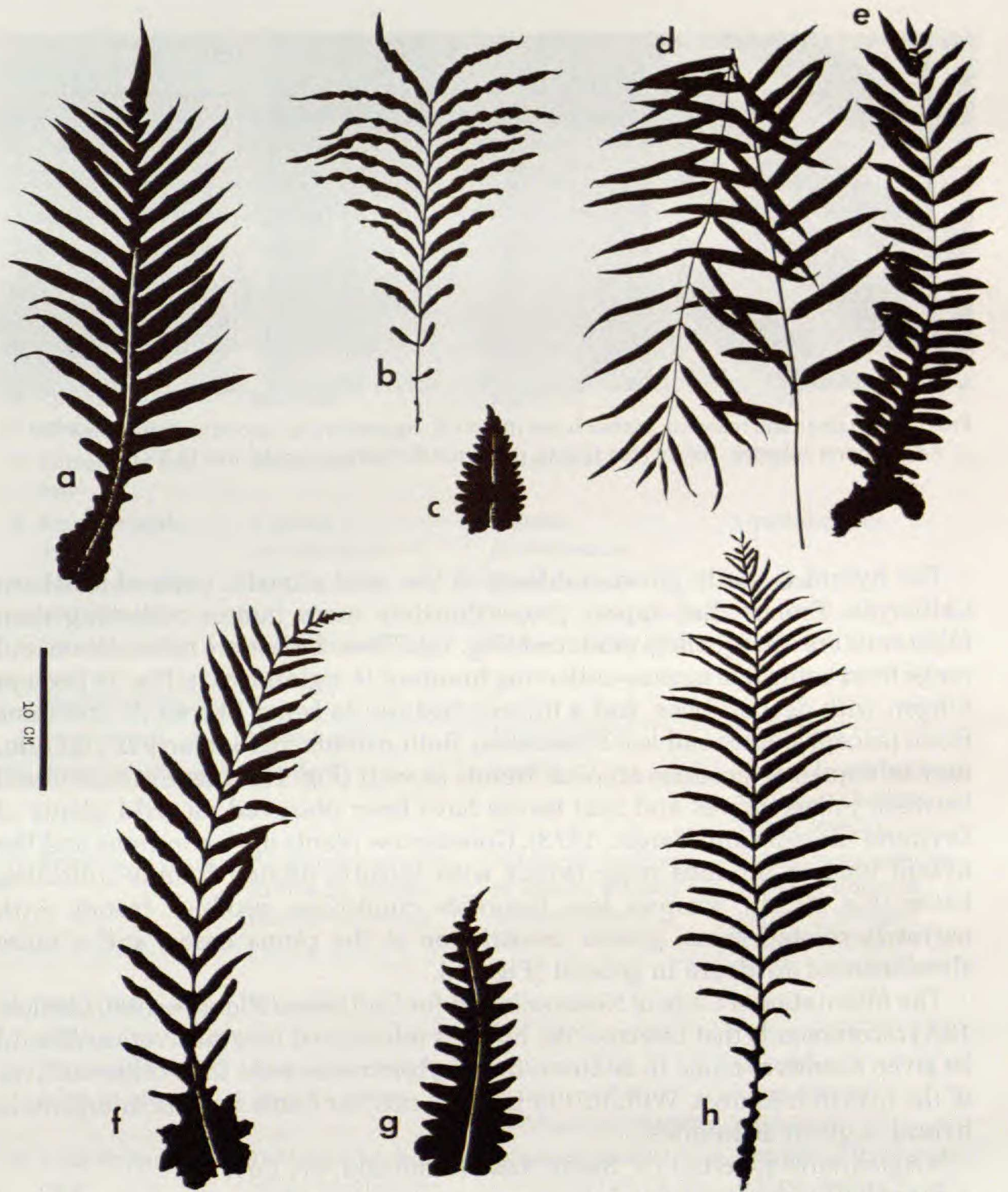


FIG. 1. Fronds of parents and hybrid. a, *Aglaomorpha coronans*, frond. b–e, *Drynaria rigidula*. b, young frond. c, humus collecting frond. d, foliage frond. e, atypical frond. f–h, \times *Aglaonaria robertsii*. f, frond. g, atypical frond. h, frond from more exposed environment.

coronans. Usually there is only one sorus between main veins but occasionally there are two or two partly coalesced sori (Fig. 2c). Comparison of these and other structures of the parents and the hybrid are given in Table 1.

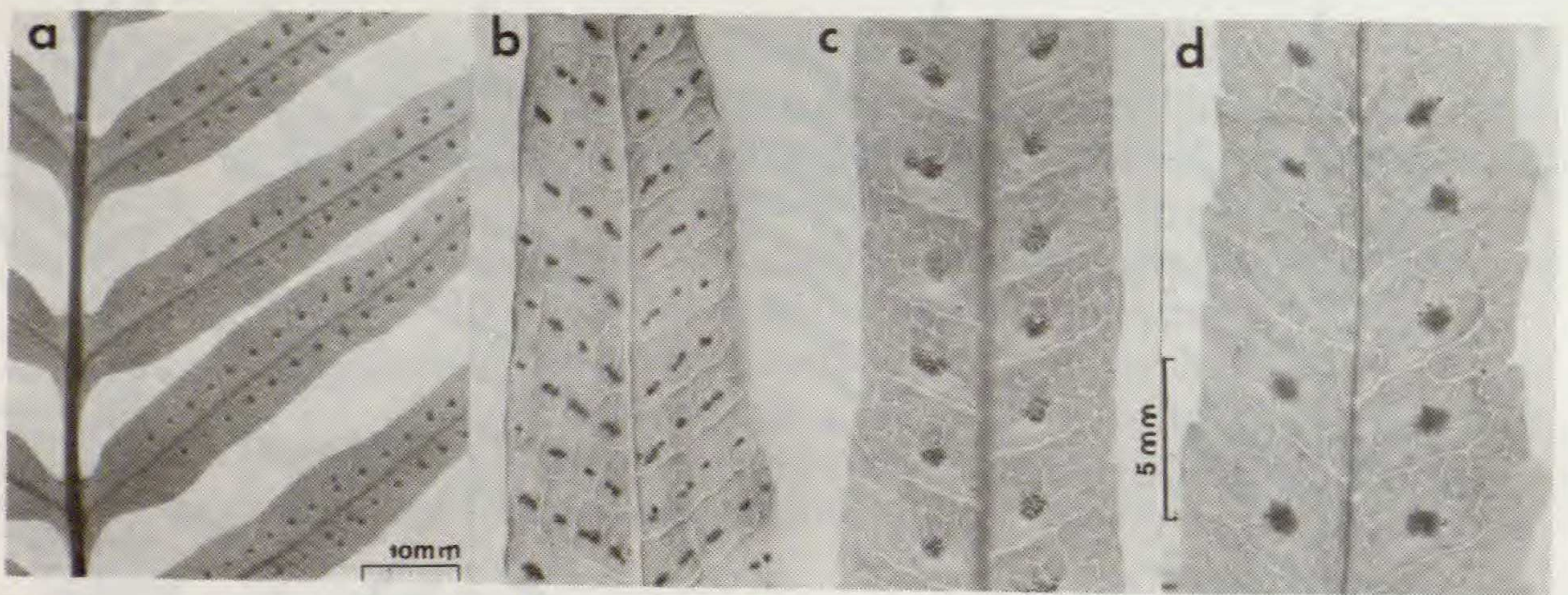


FIG. 2. a, \times *Aglaonaria robertsii*, pinnae bases ($0.3\times$). b, *Aglaomorpha coronans*, fertile area ($2.5\times$). c, \times *Aglaonaria robertsii*, fertile area ($2.5\times$). d, *Drynaria rigidula*, fertile area ($2.5\times$).

The hybrid is easily grown outdoors in the mild climatic parts of southern California. Fronds that appear proportionately more humus-collecting than foliaceous are infrequently produced (Fig. 1g). These fronds are not uniform and range from being like humus-collecting fronds of *D. rigidula* as in Fig. 1c (except longer, with deeper lobes, and a thinner texture) to being like an *A. coronans* frond (except stouter and less foliaceous). Both parents, particularly *D. rigidula*, may infrequently produce atypical fronds as well (Fig. 1e). Leaves transitional between foliage leaves and nest leaves have been observed on wild plants of *Drynaria* (Zamora and Vargas, 1973). Greenhouse plants of *A. coronans* and the hybrid tend to produce more fronds with broadly dilated humus-collecting bases (Fig. 1a, f), whereas less favorable conditions produce fronds with narrowly dilated bases, greater constriction at the pinna bases, and a more slender frond structure in general (Fig. 1h).

The *International Code of Nomenclature for Cultivated Plants—1980* (Article 19A) recommends that interspecific hybrids introduced into cultivation should be given a cultivar name in addition to its hybrid name even if no other cultivar of the hybrid is known. With this in mind, a cultivar name for this intergeneric hybrid is given as follows:

\times *Aglaonaria robertsii* cv. **Santa Rosa** Hoshizaki, cv. nov.

Essentially monomorphic. Like *A. coronans* in general growth habit and frond form except the foliaceous part of the blade mostly pinnatisect, of smaller dimensions except in frond length, firm, and medium green. Pinnae lanceolate to linear-lanceolate, slightly constricted above their adnate base, margins obscurely serrate, apices attenuate to acute to rounded. Frond apex usually pinnatilobed, diminishing to a small elongate terminal segment. Sori roundish to oblong, one or sometimes two (separate or partly coalesced) borne between the main veins of the lobe.

The study by Roos (1985) on the *Drynarioideae* provided a base from which morphological and anatomical features of the parents may be compared to the

TABLE 1. Morphological Characteristics of *Aglaomorpha coronans*, ×*Aglaonaria robertsii*, and *Drynaria rigidula*

	<i>Aglaomorpha coronans</i>	× <i>Aglaonaria robertsii</i>	<i>Drynaria rigidula</i>
1. Rhizome diameter:	2–3 cm	2–2.5 cm	1–2 cm
2. Rhizome vascular bundle pattern:	Oval, dorsal side with 2 deep invaginations or more complex	Elliptic to broadly lunate, the dorsal side shorter, often interrupted by leaf traces (protrusions)	
3. Vascular bundle size:	All about equal	Dorsal bundles (ca. 4) slightly larger than others	
4. Rhizome scale attachment:	Basifixed	Basifixed	Peltate
5. Rhizome scales base:	Auriculate	Auriculate	Peltate
6. Rhizome scale teeth:	2 united protuberances	2 united protuberances	1 protuberance
7. Rhizome scale teeth shape:	Medium stout	Medium stout	Slender
8. Rhizome scale color at attachment point:	Not noticeably dark	Not noticeably dark	Dark
9. Frond types:	Monomorphic	Monomorphic	Dimorphic
10. Frond attachment:	Sessile	Sessile	Foliage fronds stalked, humus-collecting fronds sessile
11. Frond base shape:	All fronds narrowly to broadly dilated, humus-collecting	All fronds narrowly to broadly dilated, humus-collecting	Foliage frond petioles naked or ridged to narrowly winged; humus-collecting fronds broad at base
12. Blade, foliaceous part:	Pinnatifid	Pinnatisect	Pinnate
13. Connection of lobes or pinnae:	Connected along costa by a wing	Connected by extension of thin cartilagenous margin	separate, not connected by extensions
14. Lobe or pinna base:	Uniformly wide or wider towards the base	Mostly somewhat constricted above the base	Tapered at the base to a short, narrowly winged stalk
15. Lobe or pinna size:	15–35 × 1.2–5 cm	6–26 × 1.5–2.5 cm	8–25 × 0.5–3 cm
16. Lobe or pinna margins:	Entire	Obscurely serrate	Shallowly serrate
17. Frond apex:	An elongate, entire lobe with 2–3 smaller lobes at its base	Pinnately lobed to a small terminal segment, or aborted	Aborted, or if apical pinna appearing present, conform
18. Veins:	Prominently raised	Moderately raised	Not or slightly raised
19. Minor areole size:	Mostly 2 mm or less	Mostly 2 mm or less	Mostly greater than 2 mm

TABLE 1. Continued.

	<i>Aglaomorpha coronans</i>	× <i>Aglaonaria robertsii</i>	<i>Drynaria rigidula</i>
20. Minor areole shape and orientation:	Very variable in shape and orientation	Variable in shape and orientation	Mostly longer than wide with long axis oblique to costa
21. Hydathodes:	Present	Absent	Absent
22. Vein tips:	Strongly enlarged	Enlarged or not	Not enlarged
23. Foliage texture:	Hard, leathery	Firm	Firm
24. Foliar hypodermis:	Present adaxially	Absent adaxially	Absent adaxially
25. Foliage color:	Dark green	Medium green	Medium green
26. Laminal scales:	Absent at maturity	Present, sparse	Present, sparse
27. Scales on costa and rachis:	Basifixed	Basifixed, pseudopeltate, or infrequently peltate	Peltate, pseudopeltate or basifixed
28. Shape of sori:	Oblong to linear	Round to sublinear	Round
29. Sori between main lateral veins of lobe or pinna:	Several in a row, sometimes coalesced	1, sometimes 2, coalesced or separate	1
30. Sporangia:	Normal	Normal or malformed	Normal
31. Spores:	Normal	Irregularly shaped	Normal
32. Perispore:	Smooth or folded	Verrucate	Verrucate

hybrid. Only a few of his more readily definable characters are listed in Table 1. This hybrid touches on the generic relationship between *Aglaomorpha* and *Drynaria*; whether it provides sufficient evidence for combining the two genera will need to be assessed in the future. The two genera are deemed by Chandra (1982) and Roos as quite separate; see "Chosen cladogram" (Roos, 1985; p. 120, fig. 7.43).

Wagner (1969) stressed the intermediacy of character states in hybrids. This is particularly noticeable in the frond shape, which may be a blend (incomplete dominance) or an irregular mixture of the two parents. However, other parts of the hybrid may resemble one or the other parent and may indicate simple dominance. The absence of hydathodes and the softer texture and lighter color of the hybrid corresponds to the phenotype of the *Drynaria* parent, while the rhizome scales are like those of the *Aglaomorpha* parent. Further comparison of ×*Aglaonaria robertsii* and other hybrids with their respective parents may help indicate how phenotypic characters are inherited and whether these patterns are common to certain ferns.

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